

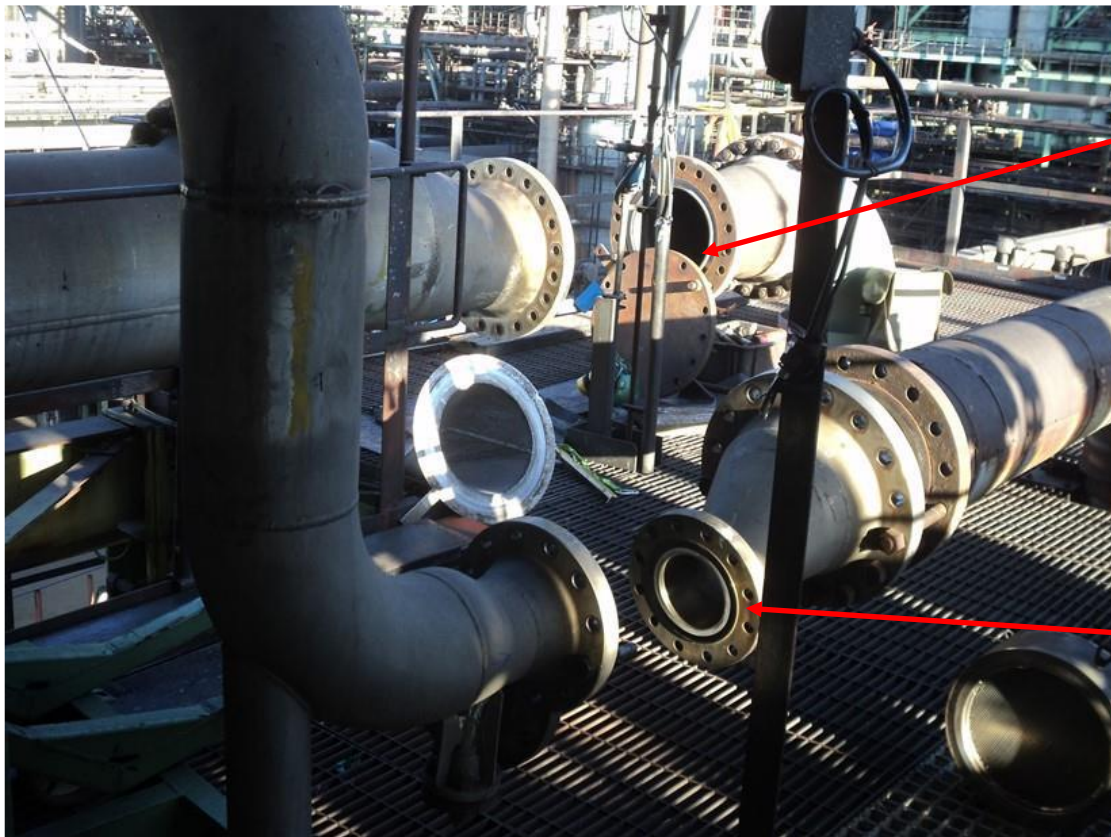
SASOL – Learning (Exposure to hydrocarbons)

Description:

- On 31 August 2021 during the annual shutdown, as part of the planned statutory maintenance scope, a mechanical team was tasked to remove three instrument control valves. Two mechanical fitters were installing an end blank after the removal of an instrument control valve on the tail-gas header to the flare, as part of the shutdown activities for phase 2. These two mechanical fitters were exposed to hydrocarbons.
- On 9 September 2021 two service provider mechanical fitters and a rigger were aligning an instrument control valve (20FV-096A), removed on 31 August as mentioned above. The mechanical service provider foreman instructed two other mechanical fitters to complete the final box up of another instrument control valve (020FV-096G) in proximity of 20FV-096A. During the process of boxing up the instrument control valve (020FV-096G), one mechanical fitter was exposed to hydrocarbons.

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31 August 2021

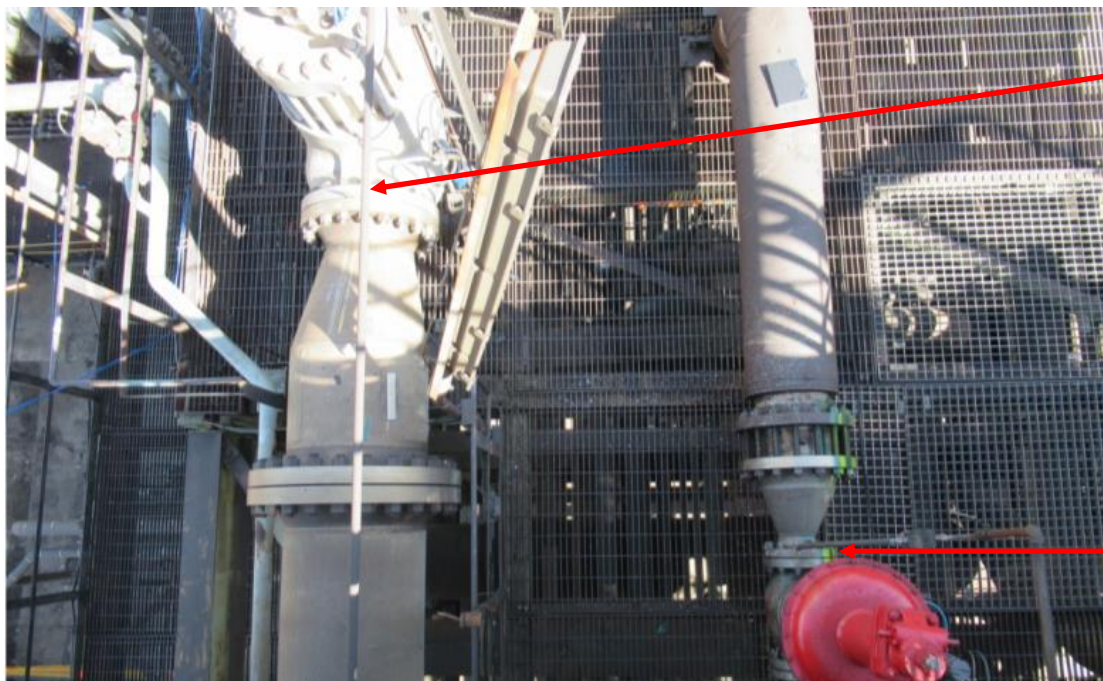


The end blank that was in the process of being installed, after the removal of the instrument control valve 20FV096A.

The opening where the instrument control valve 20FV096G was removed on the same system prior to the removal of the instrument control valve 20FV096A

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9 September 2021



The instrument control valve 20FV096A from where gas was released

The instrument control valve 020FV-096G where the mechanical fitter was exposed to hydrocarbons

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KUE:

- Exposure to non-life supporting atmospheres.
- Although not a confined space, carbon monoxide was released, and team members were exposed to hydrocarbons.

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Incident on 31 August 2021:

Communication: Ineffective communication across divisions, teams, business units.

- Ineffective communication between the key role players with regards to the removal of the specific instrument control valve. If the team was aligned with the intent to remove this instrument control valve, different safety conditions would have been specified such as mandatory airline masks.
- The valves were planned for 4 September, but the instrument foreman requested that 20FV096G be removed as he required it to be sent to valve shop. It is a norm that all 3 valves are removed during the same shift due to the crane position.
- Communication failure due to the team not properly communicating regarding the sequence of the removal of the valves.

Management system and administration: Risk management systems TRA/ SOP/ PTR/ SLAM/ PDA/ PTO inadequate / insufficient.

- Insufficient purging method was used on the flare system on which the valves are situated. Hydrocarbons remained in the system and the safe maker did not verify the system is hydrocarbon free at a drain or vent point. This created a dead leg on the flare system as the 20FV096A was in a closed position.

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Human Factor - Hazard not recognized or appreciated.

- The issuer, safe maker and recipient did not anticipate the possibility of gas in the system. It was stated that safe making on that system was complete, thus giving the indication that the system was safe.

Team dynamics / culture: Unclear roles and responsibilities across divisions.

- Cultural way of issuing the permits.
- Mechanical teams have been receiving permits as scope owners for instrumentation as a norm.
- Mechanical receiving permits as scope owners for instrument valves. Do not support sufficient instrumentation scope management as asset owners.

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Incident on 09 September 2021:

Equipment /Process exposure: Loss of containment due to leaking valve.

- Interface valve was passing through, this occurred during intermittent flaring at the A HP flare header.

Procedure or rule not followed

- The mechanical service provider fitter worked on 020FV096G without the use of an airline mask.
- The use of an airline mask was specified on the permit to work, service provider job Hazard analysis, service provider risk assessment, service provider method statement and service provider safe work procedure.

Management failure

- Inadequate decision by the mechanical service provider supervisor to instruct team members to work on instrument control valve (020FV-096G) and failed to stop them when he saw that the team members did not use airline masks while working on instrument control valve (020FV-096G).

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Flare systems, headers and large diameter process lines contain hazardous products.

Managers to ensure when conducting activities on these systems the following should always be taken into consideration:

- **Safe making**
 - Detailed requirements on the safe making of systems containing hazardous product e.g. hydrocarbons, work area to be declared safe by including LEL measurements inside equipment and enforcing proper purging of the system for hot and cold work tasks.
- **Maintain safe conditions**
 - When conducting cold work on hydrocarbon systems, for example removal of valves, ensure the system is purged from all ends.
 - Remove a vent or drain end blank and ensure the system is LEL free before opening large flanges.
 - Production standby to stand in gas free area with gas meter to indicate if it is safe to remove air-line masks after completion of task.
 - Use airline masks if LEL of zero cannot be achieved. (No employee without an airline mask allowed in the immediate work area).

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- **Permit to Work**
 - The safe making conditions and risks as stipulated on the Permit to Work must reflect the actual safe making conditions as on the plant.
 - Communicate the conditions of the permit to the recipient and task executor, ensure that the work area hazards are clearly understood before signing on the permit.
 - Should the precautions and conditions as stipulated on the permit not be met, any team members can stop the work and production can cancel the permit.
- **Touch and tag**
 - Physically verify by touching and tagging the correct equipment where the task is going to be performed (Safe maker, recipient and task executor to be present on site and the tag register completed).
- **First line break**
 - All flanges on flare systems should always be considered as live and first line break principles must be applied
 - Consider forced draft ventilation (copus fan) during first line breaks when sufficient natural ventilation is not present (wind still days).
 - All parties should understand their role in first line break.

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- **General**

- Sufficient communication between all parties on the work to be executed on the plant and the sequence that needs to be followed.
- Encourage the reporting of changing conditions and unsafe behaviours.

SASOL – COVID-19 TESTING AND VACCINATION



END